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(54) **CENTRIFUGE**

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CPC ***F26B 5/08*** (2013.01)

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USPC 34/58, 501, 208, 210; 210/85, 143, 375; 494/11, 38, 42
See application file for complete search history.

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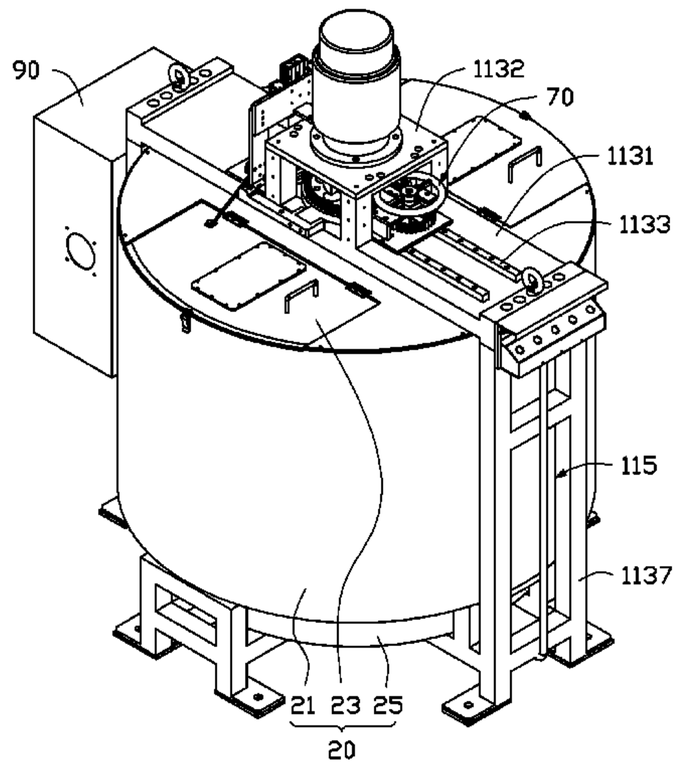
(57) **ABSTRACT**

A centrifuge includes a centrifuging compartment, a supporting assembly adjacent to the centrifuging compartment, a rotation mechanism mounted on the supporting assembly, and a feeding frame positioned in the centrifuging compartment. The centrifuging compartment includes a housing defining a inlet on a top thereof and a sealing cover pivotably coupling to the housing to cover the inlet. The supporting assembly includes a supporting portion positioned beside the housing and a base plate mounted on the supporting portion and located above the housing. The rotation mechanism rotatably extends through the top surface of the housing and the base plate, and coupling to a bottom surface of the housing. The feeding frame is positioned in the housing and coupling to the rotation mechanism, comprising a loading portion, and defining a positioning hole on a top thereof.

20 Claims, 7 Drawing Sheets



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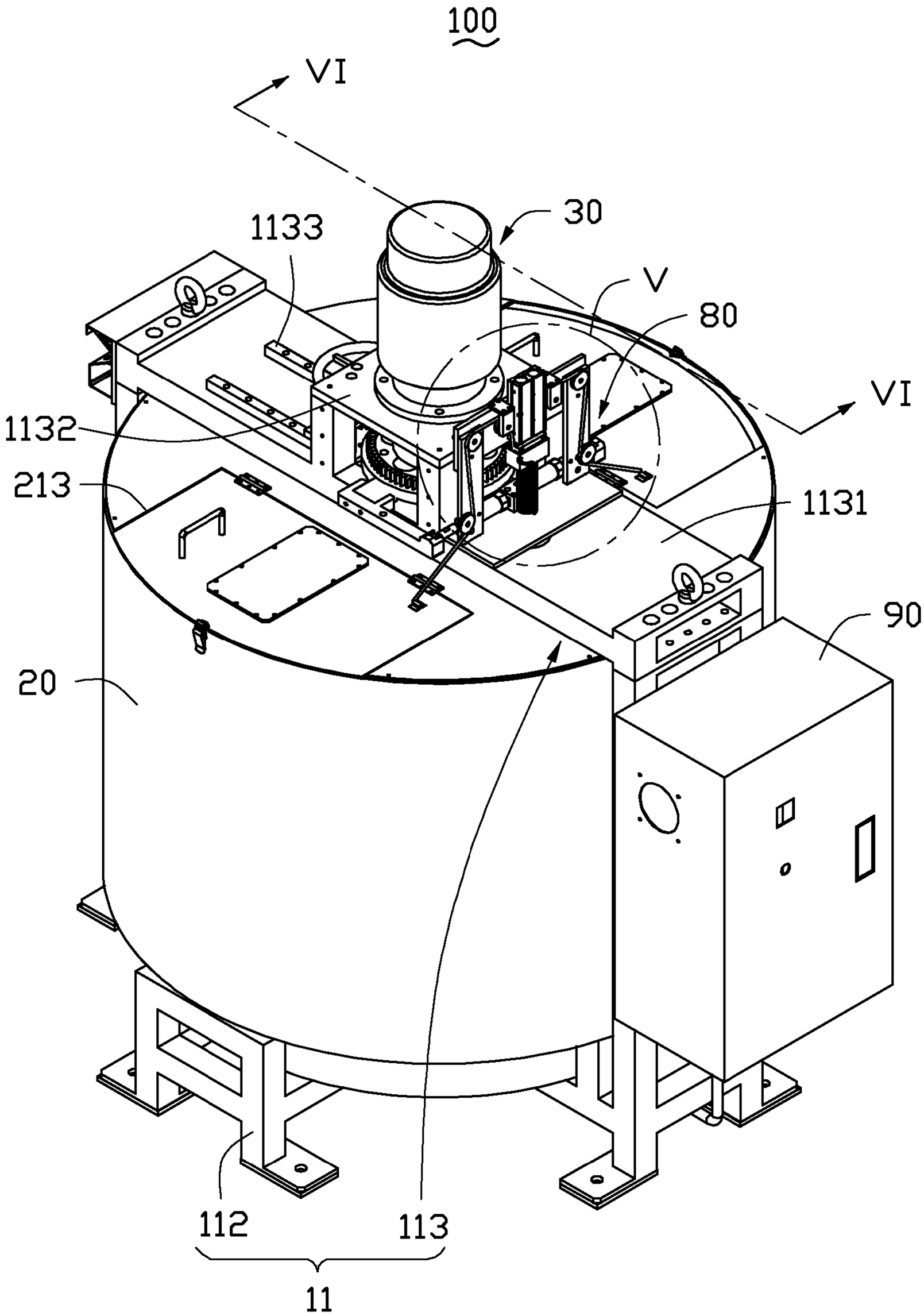

FIG. 1

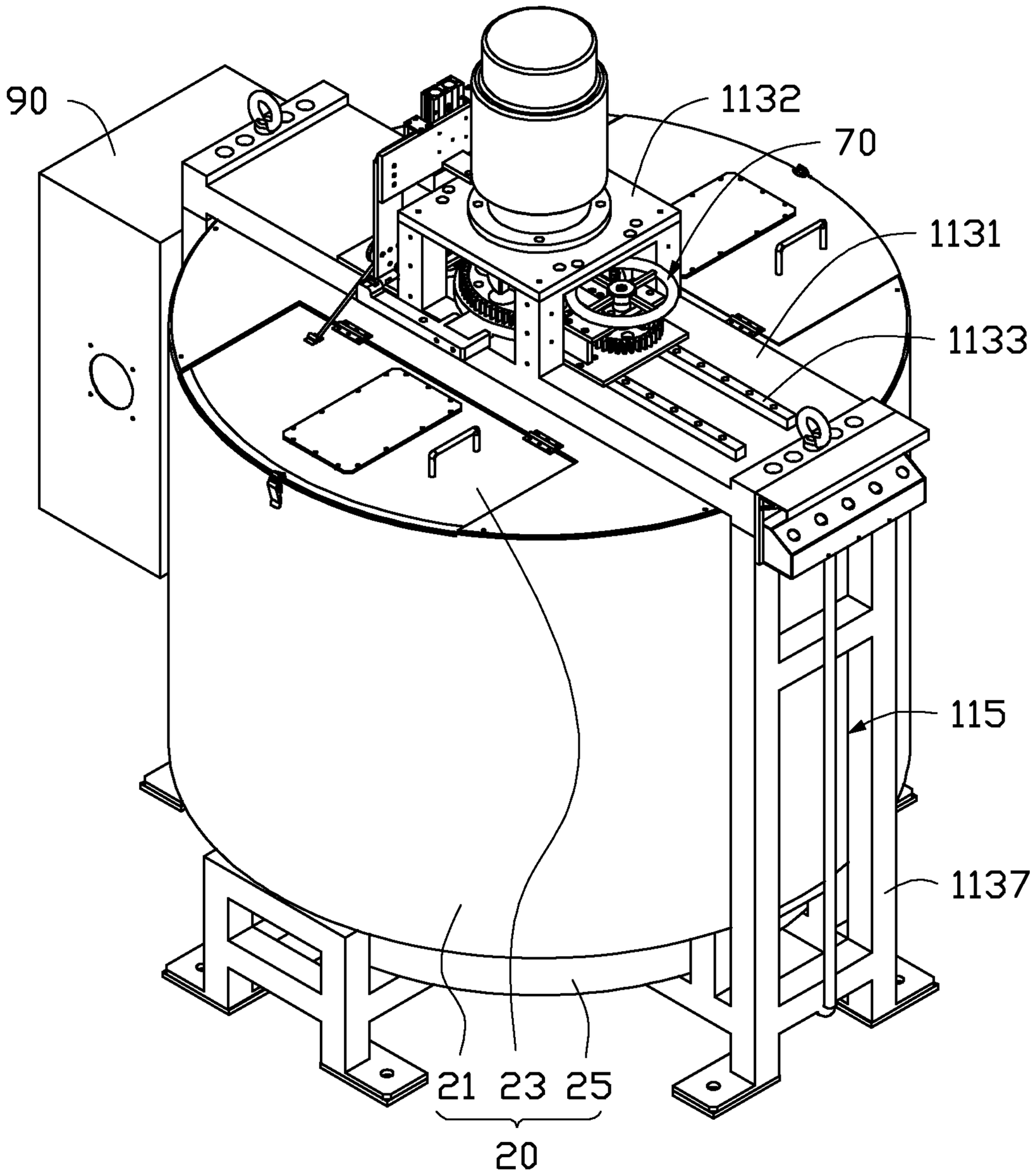

FIG. 2

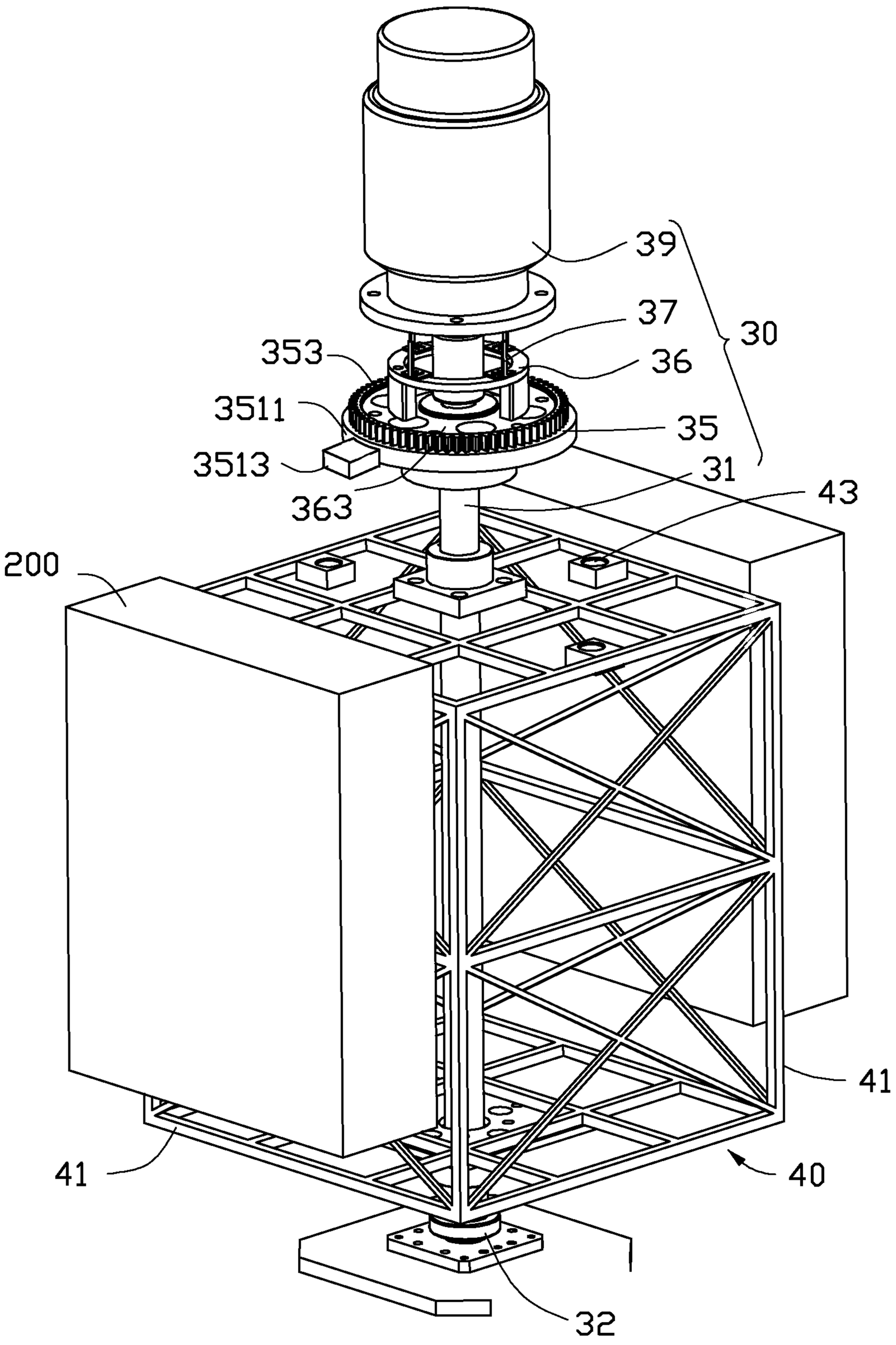

FIG. 3

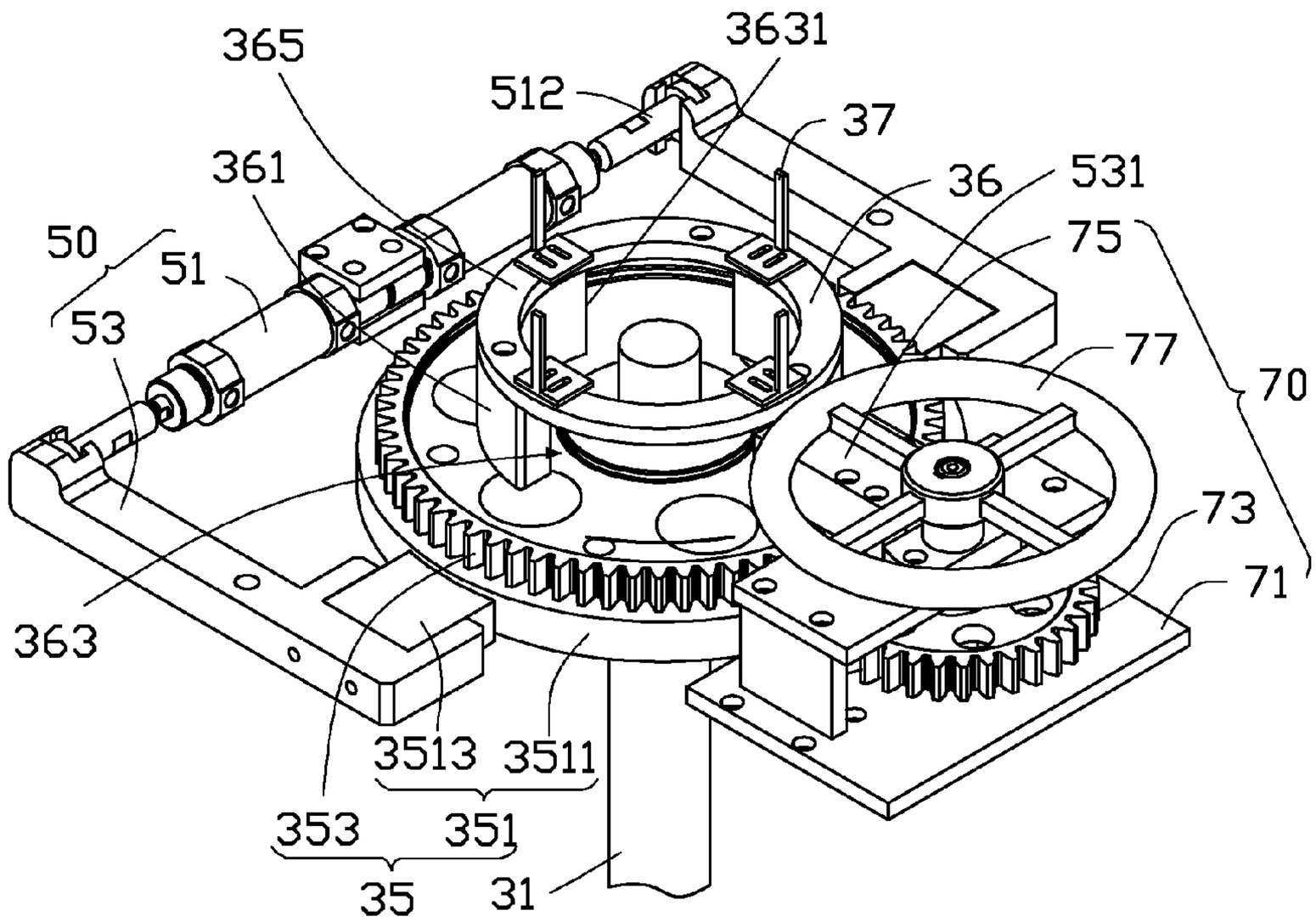
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FIG. 4

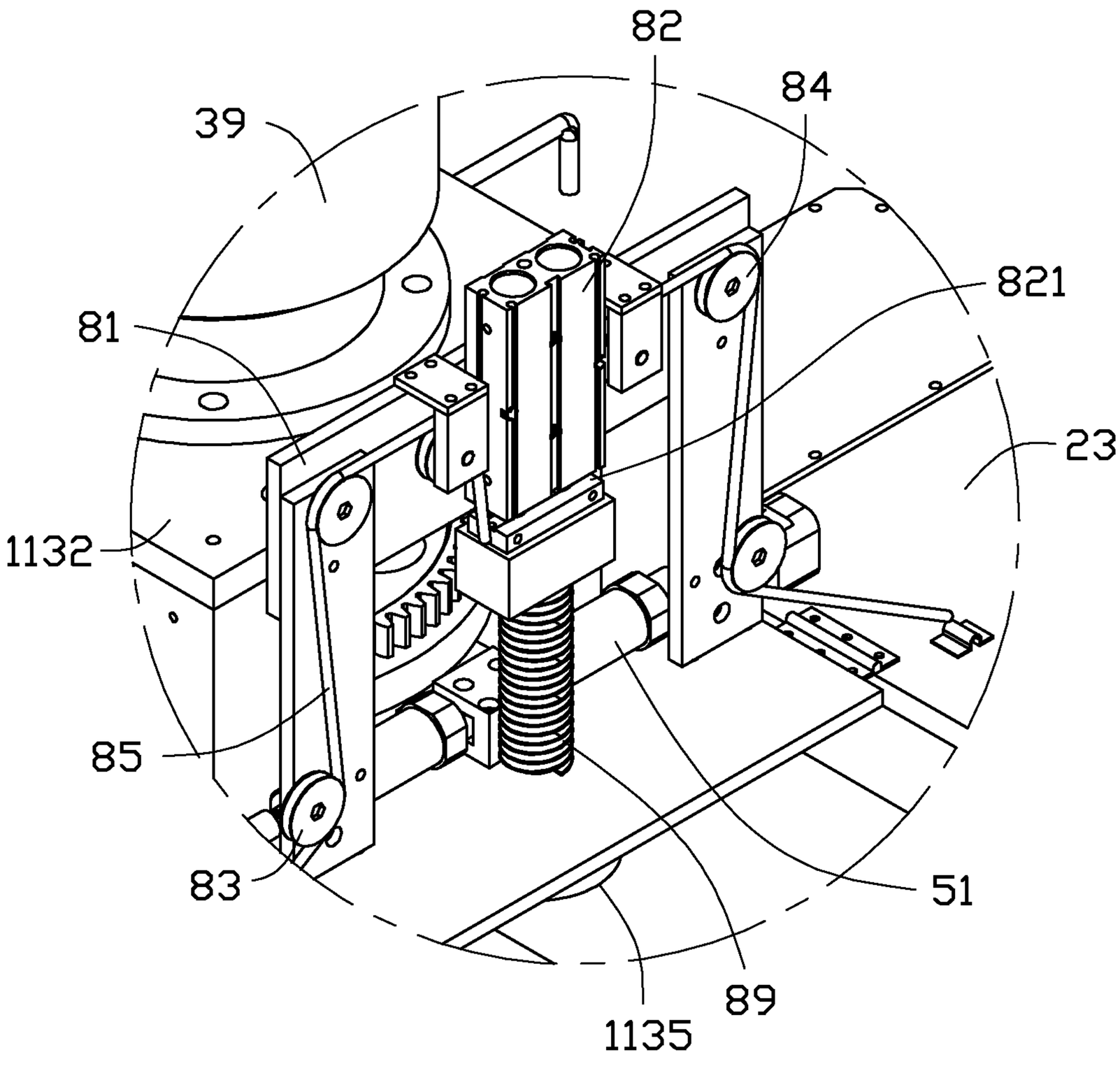

FIG. 5

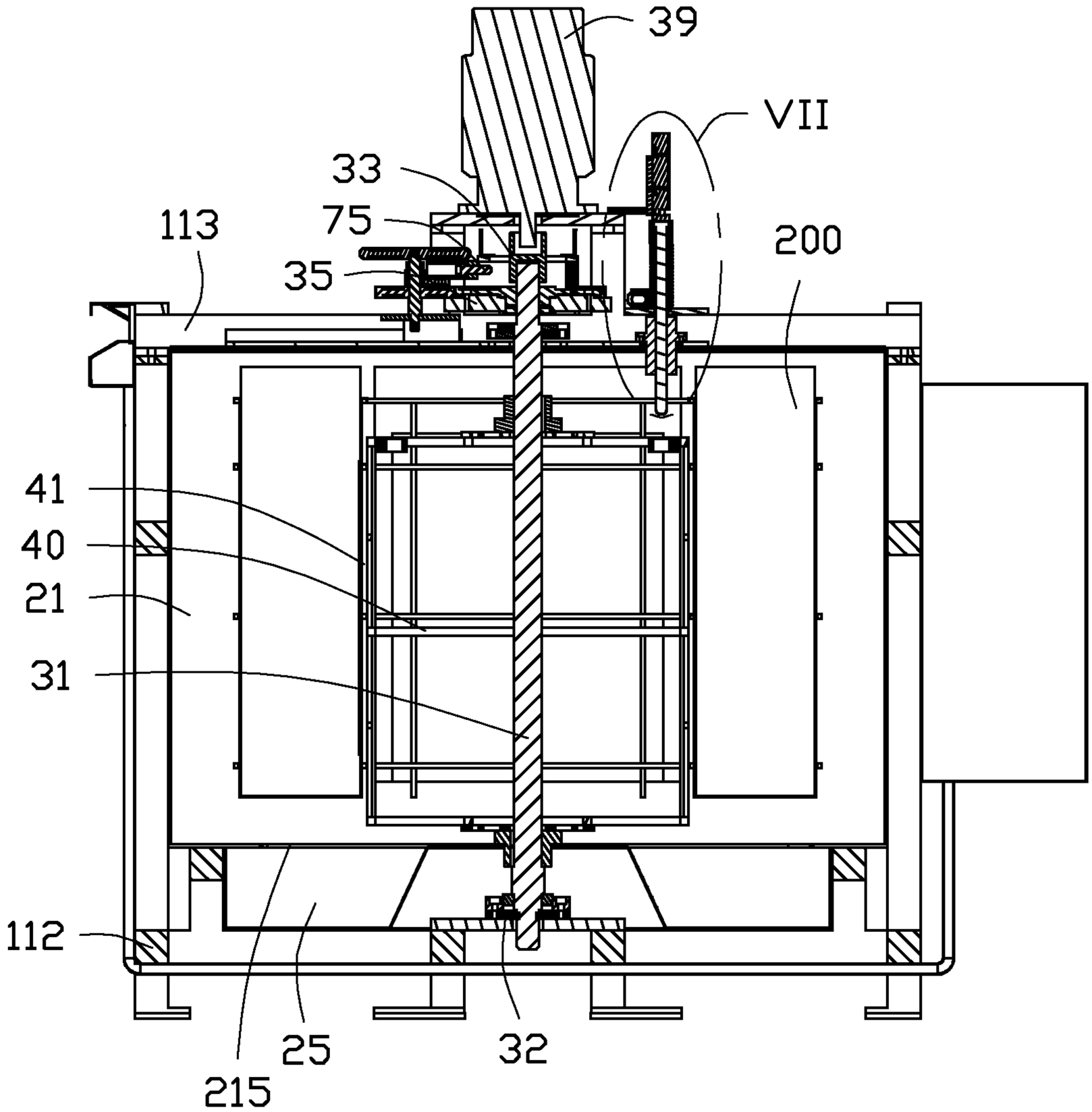

FIG. 6

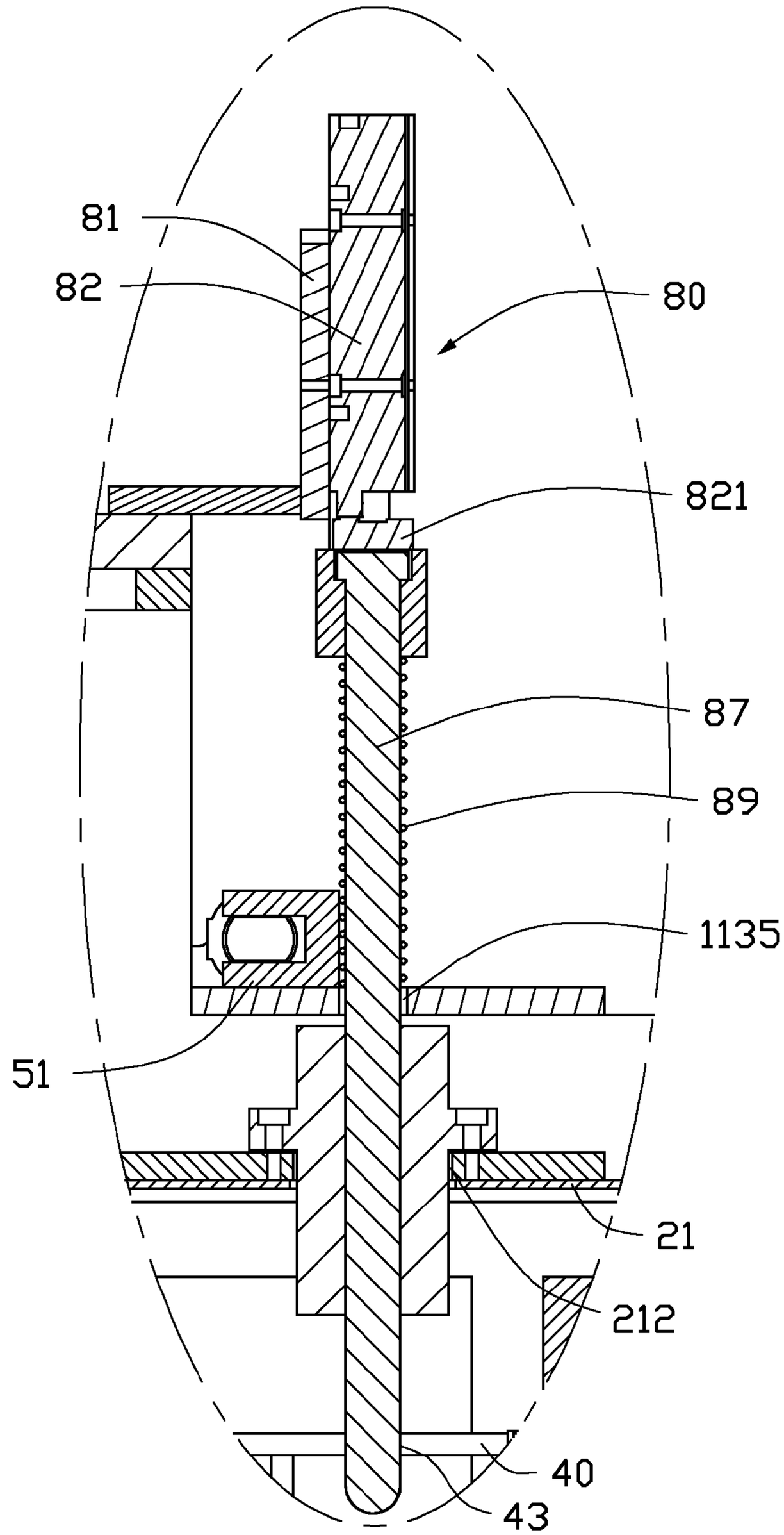

FIG. 7

CENTRIFUGE

FIELD

The present disclosure relates to centrifuges, and particularly to industrial centrifuges.

BACKGROUND

A centrifuge can be used to separate liquids or substances from each other.

BRIEF DESCRIPTION OF THE DRAWINGS

The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Moreover, in the drawings, like reference numerals designate corresponding parts throughout several views.

FIG. **1** is an isometric view of an embodiment of a centrifuge, the centrifuge including a rotation mechanism and a supporting assembly.

FIG. **2** is similar to FIG. **1**, but viewed from another angle.

FIG. **3** is an isometric view of the rotation mechanism and the supporting assembly of the centrifuge of FIG. **1**.

FIG. **4** is a partial isometric view of the centrifuge of FIG. **2**.

FIG. **5** is an enlarged isometric view of circled portion V of FIG. **1**.

FIG. **6** is a cross-sectional view taken along line VI-VI of FIG. **1**.

FIG. **7** is an enlarged cross-sectional view of circled portion VII of FIG. **6**.

DETAILED DESCRIPTION

It will be appreciated that for simplicity and clarity of illustration, where appropriate, reference numerals have been repeated among the different figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein can be practiced without these specific details. In other instances, methods, procedures and components have not been described in detail so as not to obscure the related relevant feature being described. Also, the description is not to be considered as limiting the scope of the embodiments described herein. The drawings are not necessarily to scale and the proportions of certain parts have been exaggerated to better illustrate details and features of the present disclosure.

Several definitions that apply throughout this disclosure will now be presented.

The term "coupled" is defined as connected, whether directly or indirectly through intervening components, and is not necessarily limited to physical connections. The connection can be such that the objects are permanently connected or releasably connected. The term "outside" refers to a region that is beyond the outermost confines of a physical object. The term "inside" indicates that at least a portion of a region is partially contained within a boundary formed by the object. The term "substantially" is defined to be essentially conforming to the particular dimension, shape or other word that substantially modifies, such that the component need not be exact. For example, substantially cylindrical means that the object resembles a cylinder, but can have one or more deviations from a true cylinder. The term "comprising," when utilized, means "including, but not necessarily limited to"; it specifically indicates open-ended inclusion or membership in the so-described combination, group, series and the like.

The present disclosure is described in relation to centrifuges, and particularly to industrial centrifuges.

A centrifuge configured to remove moisture from a workpiece, can include a supporting assembly, a centrifuging compartment, a rotation mechanism, a feeding frame, and an uncovering mechanism. The supporting assembly can include a supporting portion, and a base plate coupled to the supporting portion. The centrifuging compartment can include a housing having a top surface that forms at least one inlet, and at least one sealing cover pivotably coupled to the housing. The housing can be located beneath the base plate and adjacent to the supporting portion. The at least one sealing cover can be configured to cover a corresponding one of the at least one inlet. The rotation mechanism can be coupled to a bottom surface of the housing and configured to rotatably extend through the top surface of the housing and the base plate. The feeding frame can be coupled to the rotation mechanism and can be located within the housing. The feeding frame can include at least one loading portion configured to support and hold the workpiece. The feeding frame can further form a positioning hole corresponding to the at least one loading portion. The uncovering mechanism can be mounted on the supporting assembly, and can include a mounting frame coupled to the base plate, a driving member coupled to the mounting frame, at least one transmission belt coupled to the sealing cover and the driving rod, and a guiding rod coupled to the driving member. The driving member can include a driving rod coupled to the guiding rod. The at least one transmission belt can transmit motion from the driving rod to the sealing cover. The guiding rod can movably extend through the top surface of the housing. The driving rod can be configured to press the guiding rod to be inserted into the position hole to position the feeding frame, thereby aligning the workpiece to the inlet and simultaneously the driving rod cause the transmission belt to rotate the sealing cover to expose the inlet.

FIGS. **1-2** illustrate an embodiment of a centrifuge **100** configured to remove moisture from a workpiece **200**. The centrifuge **100** can include a retaining frame **11**, a centrifuging compartment **20**, a rotation mechanism **30**, a feeding frame **40**, a braking mechanism **50**, an adjusting mechanism **70**, an uncovering mechanism **80**, and a controller **90**.

The retaining frame **11** can include a base **112**, and a supporting assembly **113** mounted on the base **112**. The supporting assembly **113** can include two supporting portions **1137** mounted on opposite sides of the base **112**, a base plate **1131** mounted on the two supporting portions **1137**, a mounting portion **1132** protruding from the base plate **1131**, and two guiding rails **1133**. The two guiding rails **1133** can be located on the base plate **1131** at a first side of the mounting portion **1132**. The two supporting portions **1137** can extend substantially perpendicularly from respective opposite ends of the base **112**. The base plate **1131** can span from one of the two supporting portions **1137** to the other supporting portion **1137**. The base plate **1131** can be mounted above the base **112**. The base plate **1131**, the base **112**, and the two supporting portions **1137** can cooperatively define a receiving space **115**. The base plate **1131** can define a first through hole **1135** (see FIG. **7**) at a second side of the mounting portion **1132** opposite to the first side. The mounting portion **1132** can be a hollow structure.

The centrifuging compartment **20** can be received in the receiving space **115** and be coupled to the base plate **1131** and

the base **112**. The centrifuging compartment **20** can include a housing **21**, two sealing covers **23**, and a collection box **25**. The housing **21** can be substantially a hollow cylinder. The housing **21** can define a second through hole **212** (see FIG. **7**) and two inlets **213** in a top surface thereof, and can further define a draining hole **215** (see FIG. **6**.) in a bottom surface thereof. The second through hole **212** can extend to the first through hole **1135**. The two inlets **213** can be defined at opposite sides of the top surface of the housing **21**. The two sealing covers **23** can be pivotably coupled to the housing **21** and cover the two inlets **213**, respectively. The collection box **25** can be received in the receiving space **115** and can be coupled to the bottom surface of the housing **21**. The draining hole **215** can fluidly communicate with an inner space of the collection box **25**, such that fluid contained in the housing **21** can flow through the draining hole **215** into the collection box **25**.

Referring to FIGS. **3**, **4**, and **6**, the rotation mechanism **30** can include a shaft **31**, an adjusting assembly **35**, a bracket **36**, four sensors **37**, and a first driver **39**. The shaft **31** can be inserted through the base plate **1131**, the housing **21**, the feeding frame **40**, and the collection box **25**, and finally pivotably couple to the base **112** by a bearing **32**. The adjusting assembly **35** can sleeve on the shaft **31** and be received in the mounting portion **1132**. The adjusting assembly **35** can include a braking wheel **351** and an adjusting wheel **353**. The braking wheel **351** can include a main body **3511** mounted on the shaft **31**, and two latches **3513** protruding from the main body **3511**. The two latches **3513** can protrude from opposite sides of the main body **3511** and extend along a radial direction of the main body **3511**. The adjusting wheel **353** can be coaxially positioned on the braking wheel **351**. The bracket **36** can be mounted on the adjusting wheel **353**. The bracket **36** can include a supporting wall **361**, and a top surface **365** mounted on the supporting wall **361**. Two cutouts **363** can be defined in opposite sides of the supporting wall **361**, thereby dividing the supporting wall **361** into a first part (not labeled) and a second part (not labeled). In the illustrated embodiment, each cutout **363** can be bordered by the first part and the second part of the supporting wall **361**. An angle of each cutout **363** can be about 90 degrees. The four sensors **37** can be mounted on the top surface **365** and be substantially evenly spaced from each other. The sensors **37** can sense a location of the workpieces **200** in the housing **21** and can determine if the workpieces **200** are aligned to the inlets **213**. When the workpieces **200** are aligned to the inlets **213**, the workpieces **200** can be removed from the housing **21**. The first driver **39** can be mounted on the mounting portion **1132** and be coupled to the shaft **31** by a coupler **33**.

The feeding frame **40** can be a substantially hollow rectangular frame. The feeding frame **40** can be received in the housing **21** and be mounted to the shaft **31**. The feeding frame **40** can include two loading portions **41** on opposite sides thereof. Each loading portion **41** can correspond to one of the two latches **3513** and load one workpiece **200** thereon. A top of the feeding frame **40** can define two positioning holes **43** corresponding to the two loading portions **41**, respectively. The first driver **39** can drive the shaft **31** to rotate, thus rotating the feeding frame **40** relative to the retaining frame **11**. As the feeding frame **40** rotates, moisture adhering to the workpieces **200** can be thrown off under a centrifugal force generated by rotation of the feeding frame **40**. The moisture thrown off of the workpieces **200** can collect on inner surfaces of the housing **21** and flow down to the draining hole **215**, and finally flow into the collection box **25**.

The braking mechanism **50** can include a second driver **51** and two braking rods **53**. The second driver **51** can be mounted on the base plate **1131**. Two driving shafts **512** can be mounted to two ends of the second driver **51**, respectively. Each braking rod **53** can be mounted to a corresponding driving shaft **512**. The two braking rods **53** can be positioned at opposite sides of the braking wheel **351**. Each braking rod **53** can define a latching notch **531**. Each latching notch **531** can engage with a corresponding latch **3513**. When the braking wheel **351** and the shaft **31** are stopped from rotating, the second driver **51** can drive the two braking rods **53** to move towards the braking wheel **351**, such that the latching notches **531** can be aligned to and engage with the corresponding latches **3513**, thus preventing the braking wheel **351** and the shaft **31** from rotating.

The adjusting mechanism **70** can include a sliding base **71**, an operating wheel **73**, a limiting member **75**, and a handle **77**. The sliding base **71** can be slidably positioned on the two guiding rails **1133**. The operating wheel **73** can be rotatably positioned on the sliding base **71**. The limiting member **75** can partially protrude from the sliding base **71** and movably couple to the sliding base **71** via an elastic member (not shown). The limiting member **75** can extend into one of the cutouts **363** to resist the shaft **31** from rotating. The handle **77** can be coupled to the operating wheel **73**. When the feeding frame **40** and the rotation mechanism **30** are stopped from rotating, if the workpieces **200** are not aligned to the inlets **213**, the sliding base **71** can slide towards the adjusting wheel **353**, until the operating wheel **73** meshes with the adjusting wheel **353**. Then, the handle **77** can be rotated by an external force, thereby enabling the operating wheel **73** to drive the adjusting wheel **353** and the shaft **31** to rotate. The adjusting wheel **353** is rotated until the limiting member **75** can be inserted into one of the cutouts **363**. When the limiting member **75** inserts into one of the cutouts **363**, the adjusting wheel **353** can continue to rotate until the limiting member **75** resists against an edge of the first part or the second part of the supporting wall **361**. As a result, the adjusting wheel **353** can be prevented from rotating, and the latches **3513** can be aligned to the latching notches **531**. The second driver **51** can drive the two braking rods **53** to move towards the braking wheel **351**, such that each latching notch **531** can engage with one corresponding latch **3513**. Thus, the workpieces **200** can be aligned to the inlets **213**, and the shaft **31** is prevented from moving.

Referring to FIGS. **5-7**, the uncovering mechanism **80** can include a mounting frame **81**, a driving member **82**, a guiding rod **87**, three first tensioning wheels **83**, three second tensioning wheels **84**, and two transmission belts **85**. The mounting frame **81** can be mounted to the first side of the mounting portion **1132**. The driving member **82** can be mounted on the mounting frame **81** and can include a driving rod **821**. The guiding rod **87** can be couple to to the driving rod **821** and can be movably inserted through the first through hole **1135** and the second through hole **212**, and finally can be partially received in the housing **21**. The three first tensioning wheels **83** and the three second tensioning wheels **84** can be mounted on the mounting frame **81**. The three first tensioning wheels can be mounted adjacent to one end portion of the mounting frame **81** and be arranged substantially in an L-shape. The three second tensioning wheels **84** can be mounted adjacent to another end portion of the mounting frame **81** and be arranged substantially symmetrically to the three first tensioning wheels **83**. Each transmission belt **85** can be coupled to one corresponding sealing cover **23**. One of the transmission belts **85** can wind on the three first tension wheels **83** one-by-one and can be coupled to the driving rod **821**. Another transmission belt **85** can wind on the three second tension wheels **84** one-by-one and can be coupled to the

driving rod **821**. The first tensioning wheels **83** and the second tensioning wheels **84** can be used to set a tension of the two transmission belts **85** wound thereon. The two transmission belts **85** can transmit motion from the driving rod **821** to the sealing cover **23**. The driving member **82** can drive the driving rod **821** to move and pull the two transmission belts **85**, thus opening the corresponding sealing covers **23**, and the guiding rod **87** can guide a direction of the moving driving rod **821** and finally insert through one of the positioning holes **43** when pressed by the driving rod **821**. In other alternative embodiment, the guiding rod **87** can be omitted.

The controller **90** can be mounted to one of the supporting portions **1137**. The controller **90** can be electrically coupled to and control the sensors **37**, the first driver **39**, the second driver **51**, and the driving member **82**. The controller **90** can include a frequency converter (not shown) and a braking resistor (not shown). The first driver **39** can be started by the frequency converter, and can be stopped by the braking resistor.

In operation, the workpieces **200** can be loaded onto the loading portions **41**. The controller **90** can control the first driver **39** to drive the shaft **31** and the feeding frame **40** to rotate rapidly. Moisture adhering to the workpieces **200** can be thrown off. The thrown off moisture can flow down to the draining hole **215**, and finally flow into the collection box **25**. The controller **90** can control the first driver **39** to stop rotating the shaft **31** after a predetermined time duration.

When the workpieces **200** are stopped from rotating and not aligned to the inlets **213**, the sensors **37** can generate and transmit a signal to the controller **90**, and the controller **90** can notify an operator. The operator can slide the sliding base **71** towards the adjusting wheel **353** until the operating wheel **73** meshes with the adjusting wheel **353**. The adjusting wheel **353** can be rotated until the limiting member **75** inserts into one of the cutouts **363** and abuts against an edge of the first part or the second part of the supporting wall **361**. Thus, the latches **3513** can be aligned to the latching notches **531**. The controller **90** can control the second driver **51** to align and engage each latching notch **531** with one corresponding latch **3513**. Therefore, the workpieces **200** can be aligned to the inlets **213**, and the sensors **37** can signal the controller **90** to stop notifying the operator. Then, the controller **90** can control the driving member **82** to drive the driving rod **821** press the guiding rod **87** to be inserted into the position hole **43** to position the feeding frame **40**, thereby aligning the workpiece **200** to the inlet **213** and simultaneously the driving rod **821** cause the transmission belts **85** to rotate the sealing cover **23** to expose the inlet **213**. The workpieces **200** can be taken out of the housing **21**. The controller **90** can control the driving member **82** to move back, thereby moving the guiding rod **87** out of the positioning hole **43**, and causing the transmission belts **85** to loosen. The two sealing covers **23** can fall down by gravity, thereby covering the corresponding inlets **213**.

In an alternative embodiment, the number of the guiding rails **1133**, the inlets **213**, the sensors **37**, the braking rods **53**, the driving shafts **512**, the sealing covers **23**, the transmission belts **82**, the positioning holes **43**, the first tensioning wheels **83**, and the second tensioning wheels **84** can be changed according to actual needs.

In an alternative embodiment, the first tensioning wheels **83** and the second tensioning wheels **84** can be omitted, such that each transmission belt **85** can be coupled to the driving rod **821** directly. The base **112** can be omitted, such that the supporting portion **1137** can be positioned on the ground to support the base plate **1131**, the housing **21** can be positioned on the ground, and an end of the shaft **31** can be coupled to a bottom surface of the housing **21**. The collection box **25** can be omitted, such that the moisture flows out of the housing **21** directly.

It is believed that the present embodiments and their advantages will be understood from the foregoing description, and it will be apparent that various changes can be made thereto without departing from the scope of the embodiments or sacrificing all of its material advantages. The embodiments described herein all illustrative only, and should not be construed to limit the following claims.

What is claimed is:

1. A centrifuge configured to remove moisture from a workpiece, comprising:

a centrifuging compartment comprising:

a housing having a top surface that forms at least one inlet; and

at least one sealing cover pivotably coupled to the housing, the at least one sealing cover configured to cover a corresponding one of the at least one inlet;

a supporting assembly adjacent to the housing, comprising:

a supporting portion positioned adjacent to the housing; and

a base plate mounted on the supporting portion and located above the housing;

a rotation mechanism rotatably extending through the top surface of the housing and the base plate, and coupling to a bottom surface of the housing;

a feeding frame positioned in the housing and coupling to the rotation mechanism, the feeding frame comprising at least one loading portion configured to support and hold the workpiece, and defining a positioning hole corresponding to the at least one loading portion; and

an uncovering mechanism mounted on the supporting assembly, comprising:

a mounting frame mounted on the base plate;

a driving member mounted on the mounting frame, comprising a driving rod;

at least one transmission belt, and opposite ends of the at least one transmission belt respectively coupling to the sealing cover and the driving rod; and

a guiding rod coupling to the driving rod, and movably extending through the top surface of the housing, wherein, the driving rod is capable of pressing the guiding rod to insert into the positioning hole to position the feeding frame, thereby aligning the workpiece to the inlet, and simultaneously the driving rod cause the at least one transmission belt to rotate the sealing cover to expose the inlet.

2. The centrifuge of claim **1**, wherein the supporting assembly further comprises a mounting portion protruding from the base plate; the rotation mechanism comprises a shaft, an adjusting assembly, and a first driver; the shaft movably extends through the base plate and the top surface of the housing, and couples to the bottom surface of the housing; the feeding frame sleeves on the shaft; the adjusting assembly sleeves on the shaft and is mounted on the mounting portion; the first driver is mounted on the mounting portion and couples to the shaft.

3. The centrifuge of claim **2**, further comprising an adjusting mechanism movably positioned on the base plate, wherein the adjusting mechanism is adjacent to the adjusting assembly and meshes with the adjusting assembly, the adjusting mechanism is capable of driving the adjusting assembly and the shaft to rotate.

4. The centrifuge of claim **3**, wherein the adjusting assembly comprises an adjusting wheel, the supporting assembly

comprises a guiding rail mounted on the guiding rail adjacent to the mounting portion; the adjusting mechanism comprises a sliding base slidably positioned on the guiding rail, and an operating wheel mounted on the sliding base and being capable of meshing with the adjusting wheel.

5. The centrifuge of claim **4**, wherein the rotation mechanism comprises a bracket mounted on the adjusting wheel, and at least one sensor mounted on the bracket; the sensor is capable of sensing a location of the workpiece supported on the feeding frame, and can check if the workpiece is aligned with the inlet.

6. The centrifuge of claim **5**, wherein the bracket comprises a supporting wall coupling to the adjusting wheel, and a top surface mounted on the supporting wall; two cutouts can be defined in opposite sides of the supporting wall; the adjusting mechanism further comprises a limiting member movably positioned on the sliding base via a elastic member, and a handle coupled to the operating wheel; the limiting member is capable of extending into one of the two cutouts.

7. The centrifuge of claim **4**, wherein the adjusting assembly comprises a braking wheel, the adjusting wheel is mounted on a side of the braking wheel.

8. The centrifuge of claim **7**, further comprising braking mechanism, wherein the braking mechanism comprises a second driver and at least one braking rod; the second driver is mounted on the base plate adjacent to the mounting frame, and comprises at least one driving shaft, the at least one braking rod is mounted one corresponding driving shaft adjacent to the braking wheel; the second driver is capable of driving the at least one braking rod to move towards and engaging with the braking wheel to stop the braking wheel and the shaft from rotating.

9. The centrifuge of claim **8**, wherein the braking wheel comprises a main body mounted on the shaft, and two latches protruding from the main body; each braking rod defines a latching notch on an end away from the corresponding driving shaft; the latching notch faces to the braking wheel, such that the latching notches can engage with the corresponding latch.

10. The centrifuge of claim **1**, wherein the uncovering mechanism further comprises at least one tensioning wheel mounted on the mounting frame and adjacent to the driving member; the transmission belt winds on the tensioning wheel, and is tensioned by the tensioning wheel.

11. The centrifuge of claim **1**, wherein the base plate defines a first though hole corresponding to the guiding rod; the housing defines a second through hole on the top thereof fluidly communicating with the first through hole; the guiding rod movably extends through the first through hole and the second through hole, and is partially received in the housing.

12. The centrifuge of claim **4**, wherein the housing further comprises a collecting member coupling to the bottom surface of the housing; the housing defines a draining hole on the bottom thereof corresponding to and fluidly communicating with the collection box.

13. The centrifuge of claim **7**, further comprising a controller mounted on the supporting portion and electrically coupling to the driving member, wherein the first driver, and the second driver; the controller is capable of controlling the first driver to drive/stop the shaft to rotate/from rotating, and capable of controlling the second driver to brake the rotating action of the shaft, and further capable of control the driving rod to press the guiding rod, such that, the guiding rod inserts through the positioning hole, and the driving rod drags the transmission belt to uncover the sealing cover.

14. A centrifuge **100**, comprising:

a centrifuging compartment comprising a housing having a top surface that forms at least one inlet;

a supporting assembly adjacent to the housing, comprising:

a supporting portion positioned beside the housing; and

a base plate mounted on the supporting portion and located above the housing,

a rotation mechanism rotatably mounted on the top surface of the housing and the base plate;

a feeding frame positioned in the housing and coupling to the rotation mechanism, comprising a loading portion, and defining a positioning hole on a top thereof; and

an uncovering mechanism mounted on the supporting assembly, comprising:

a mounting frame mounted on the base plate and being above the housing;

a driving member mounted on the mounting frame, comprising a driving rod extending towards the mounting portion;

a transmission belt, and opposite ends of the transmission belt coupling to the driving rod; and

a guiding rod resisting against the driving rod, and movably extending into the housing and the positioning hole.

15. The centrifuge of claim **14**, wherein the supporting assembly further comprises a mounting portion protruding from the base plate; the rotation mechanism comprises a shaft, an adjusting assembly, and a first driver; the shaft movably extends through the base plate and the top surface of the housing, and couple to the bottom surface of the housing; the feeding frame sleeves on the shaft; the adjusting assembly sleeves on the shaft and is received in the mounting portion; the first driver is mounted on the mounting portion and couples to the shaft.

16. The centrifuge of claim **15**, further comprises an adjusting mechanism movably positioned on the base plate, the adjusting mechanism is adjacent to the adjusting assembly and mesh with the adjusting assembly.

17. The centrifuge of claim **16**, wherein the adjusting assembly comprises an adjusting wheel, the supporting assembly comprises a guiding rail mounted on the guiding rail adjacent to the mounting portion; the adjusting mechanism comprises a sliding base slidably positioned on the guiding rail, and an operating wheel mounted on the sliding base being capable of meshing with the adjusting wheel.

18. The centrifuge of claim **17**, wherein the rotation mechanism comprises a bracket mounted on the adjusting wheel, and at least one sensor mounted on the bracket.

19. The centrifuge of claim **18**, wherein the bracket comprises a supporting wall coupling to the adjusting wheel, and a top surface mounted on the supporting wall; two cutouts can be defined in opposite sides of the supporting wall; the adjusting mechanism further comprises a limiting member movably positioned on the sliding base via a elastic member, and a handle coupled to the operating wheel; the limiting member is capable of extending into one of the two cutouts.

20. A centrifuge configured to remove moisture from a workpiece, the centrifuge comprising:

a supporting assembly comprising:

a supporting portion; and

a base plate coupled to the supporting portion;

a centrifuging compartment comprising:

a housing having a top surface that forms a least one inlet, wherein the housing is located beneath the base plate and adjacent to the supporting portion; and

at least one sealing cover pivotably coupled to the housing, the at least one sealing cover configured to cover a corresponding one of the at least one inlet;

a rotation mechanism coupled to a bottom surface of the housing, the rotation mechanism configured to rotatably extend through the top surface of the housing and the base plate;

a feeding frame coupled to the rotation mechanism and located within the housing, the feeding frame comprising at least one loading portion configured to support and hold the workpiece, and the feeding frame further forming a positioning hole corresponding to the at least one loading portion;

an uncovering mechanism mounted on the supporting assembly comprising:

a mounting frame coupled to the base plate;

a driving member coupled to the mounting frame and comprising a driving rod;

at least one transmission belt coupled to the sealing cover and the driving rod, wherein the at least one transmission belt transmits motion from the driving rod to the sealing cover; and

a guiding rod coupled to the driving rod, the guiding rod movably extending through the top surface of the housing, wherein the driving rod is configured to press the guiding rod to be inserted into the position hole to position the feeding frame, thereby aligning the workpiece to the inlet and simultaneously the driving rod cause the transmission belt to rotate the sealing cover to expose the inlet.

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